MICHIGAN SUGAR COMPANY • WINTER 2013-2014

THE NEWSBEET

Taking aim at Resistance

Staying on target in the constant battle of resistance management. Our combatants include (clockwise from top left): Horseweed, Cercospora leafspot, Palmer amaranth and cyst nematodes.

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THE NEWSBEET

WINTER 2013-2014 • VOLUME 28, NO. 1

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Root of the Business

by Mark Flegenheimer, President and CEO

Standing Our Ground

As we look toward the future, we sometimes need to remember the past. A few short years ago, growers struggled with weed control. Multiple, precisely-timed, sprays were required to combat weeds and even with close attention to details, weeds still popped through the canopy of our beets. Research clearly shows the negative impact weeds have on our beet crop. The introduction of RoundUp Ready® varieties cleaned up our fields practically overnight. Yields jumped and quality improved as growers embraced this new technology.

Weedy beet fields are not too distant a memory, yet some growers are not taking the proper steps to ensure RoundUp® resistant weeds do not begin to proliferate. An outbreak of RoundUp® resistant weeds has already been seen in certain areas of the Red River Valley. In Michigan, we do not want that to happen. We are fortunate that there are a number of conventional crops (dry beans, wheat, pickles, and some soybeans) grown in rotation with beets. With 100% of our beets glyphosate resistant, growers must rotate them with one or more of the non-RoundUp Ready® crops. Failure to do so will ultimately lead to RoundUp® resistant weeds, weedy beet fields, and a loss in productivity.

Being a grower-owned cooperative, it is imperative that we do not allow this to happen. This issue of *The Newsbeet* is dedicated to resistance management. Preventing RoundUp® resistant weeds is critical for our future success. We have already seen Cercospora treatments become ineffective as resistance has been built up to strobilurin. Now, growers must adopt new spray programs with different chemicals or this yield-sapping disease will begin ravaging our crop.

Change is never easy. Planting RoundUp Ready® crops one after another may be much easier than rotating with other type crops. Continuing to use the old spray program on your beets to manage leafspot is also easier than using some of the newer chemicals that require extra care and attention when spraying. If we take the easy road, we will find sugarbeets falling behind other crops. Our Co-op's vision is to keep beets as the "Crop of Choice" in our growing region. In order to continue being the "Crop of Choice," we need to change and adapt. Read this issue of *The Newsbeet* and try to implement some of the suggestions that will help manage resistance in sugarbeets.

Our growers are some of the most progressive in the industry. I am confident our shareholders will implement these ideas in order to have our Cooperative thrive for another century. Ben Franklin said it best when he stated, "An ounce of prevention is worth a pound of cure." All growers need to do their ounce of prevention so we are not searching for cures in the future.

Crop Update

by Paul Pfenninger, Vice President of Agriculture

The Trials… and Triumphs …of 2013

2013 CROP YEAR SUMMARY	
Acres Planted	161,199
Acres Abandoned	1,394
Tons Received	4,173,009
Average Yield	26.11
Grower Sugar	18.34
Grower Clear Juice Purity (CJP)	95.96

It was a struggle to get the sugarbeet crop of 2013 started and a challenge to get fully harvested, but somewhere between April 4 and December 3, we planted and harvested a pretty good crop.

Unlike crop year 2012, when 95% of our crop was planted by mid-April, crop year 2013 saw its first field planted on April 4, but only 8,508 acres (5.3%) were planted the ENTIRE month of April! Fortunately, we had a narrow window of opportunity in early May and the majority of our crop was planted during the first two weeks in May.

Total rainfall in April ranged from 6.0" – 8.0" of rain with 20 different days of recorded precipitation. The dry conditions in early May were followed by wetter than normal conditions in late May. Someway, somehow, the crop survived and by June 15 we had 161,199 acres planted and measured.

The summer months offered additional challenges with excessive rains in the Dover, Ontario, region and drier than normal conditions over most of the remaining acres. These conditions, along with the late planted crop, influenced our decision to delay the start of harvest from September 3 until September 12 and then, once again, until September 17, 2013.

Along the way, we had abandoned 1,394 acres and had 159,805 acres to harvest. With the shortened early delivery period, we received 719,535 tons (18%) from September 17 – October 20. We had projected a 25-ton per acre crop, or about 4,000,000 tons at the start of harvest. We opened all piling grounds and pilers on October 21 for long-term storage and had ten great days for harvest until rain fell on October 31. During that ten-day stretch, we harvested 2,475,972 tons, or 60% of our crop. It took us the entire month of November to harvest the last 967,000 tons of beets due to cold temperatures and several heavy rains. The last beets were received in Croswell on December 3.

At the end of the day, we harvested a very high quality crop with decent yields and better than expected sugars. The numbers are shown in the table at left.

It was a very challenging crop, but also very rewarding. Beet temperatures were excellent during peak delivery with low tare and high quality. The beets went into storage piles in excellent condition, and we hope to keep them in great shape until the last beet can be sliced somewhere in mid-March.

Thanks to everyone for their efforts this past growing and harvest season.

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The **Amity Technology 3750** sugar beet defoliator has been engineered to provide superior defoliation at speeds up to 30% faster than its predecessor. This design reduces the time and distance required between the defoliator and harvester, allowing you to take advantage of the natural insulation provided by the crop canopy and deliver a high-quality product at a reduced cost.

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Update: Washington

One Wild Ride for the Farm Bill

by Ray VanDriessche, Director of Community and Government Relations

The Roller Coaster Ride Finally Ends for the Farm Bill

The first of the 2012 Farm Bill hearings were held by Senate Ag Committee Chairwoman Debbie Stabenow in East Lansing on May 31, 2011. After three years of bitter partisanship, fierce negotiations and compromise, to the relief of many involved with the process, the bill was finally passed on February 4, 2014. In the mix of the drawn out negotiations, and orchestrated by the Sugar Users Coalition, were five anti-sugar amendments offered in the House and four in the Senate accompanied by a constant barrage of misinformation in many of the major news publications. Despite the odds, the sugar industry prevailed and all of the amendments were defeated due to the tireless efforts of sugar industry representatives, nationally and locally, to educate legislators on how good sugar policy benefits consumers and industry alike. As a result, the sugar provisions remain the same as those implemented in the 2008 Farm Bill.

Welcome news to the sugar industry and to agriculture in general that, after three years of negotiations, farm families and agriculture-related businesses alike can look forward to the next five years with some surety and stability. The new Farm Bill includes both necessary budget reform as well as market stability provisions that will allow agriculture to continue to be one of the leading economic drivers for the U.S. economy through 2018. Tremendous recognition and appreciation are due to Chair of the Senate Ag committee, Senator Debbie Stabenow (D-MI), and Chair of the House Ag Committee, Frank Lucas (R-KS), along with Vice Chairs, Senator Ted Cochran (R-MS) and Congressman Colin Peterson (D-MN), for the leadership that bought the Farm Bill process to a close.

Passage of the five-year Farm Bill does not signal a time to sit back and relax. Grower representatives from Michigan Sugar Company will be back on Capitol Hill for the annual Hill visit in early March. The face-to-face visits with legislators and their staffers will provide an opportunity to keep members up to date on issues and express our appreciation to supportive congressional members who defended our industry in the Farm Bill process. The defeat of the anti-sugar amendments did not come easy and our industry champions in Congress need to know how much we appreciate their efforts on our behalf.

President Barack Obama signs the Farm Bill at Michigan State University in East Lansing. Senators Carl Levin, far left, and Debbie Stabenow
Used with permission. Photo by Kurt Stepnitz, MSU staff photographer.

The Impact of Imports

Excessive imports from Mexico, exceeding 2 million tons in marketing year 2012/13, continue to swamp the U.S. sugar market causing prices to hover at forfeiture levels. Representatives from the U.S. sugar industry continue to hold discussions with the Mexican sugar industry and both governments in an effort to balance the North American sugar market.

Governor Snyder Visits Michigan Sugar Company

Michigan Sugar Company was honored to host Governor Rick Snyder for a tour of our Bay City factory and a meet-and-greet with company management and employees in our Conference Center on October 21, 2013. It was very obvious from the many questions that the Governor asked, as CEO Mark Flegenheimer led the factory tour, that he has a genuine interest in what is involved in agricultural production and processing. After the tour, the Governor shook hands with management and employees and responded to questions from the audience and press. Since his visit to our site, the Governor has referred to Michigan Sugar Company at a number of speaking engagements as a shining example of how the State of Michigan can rebuild and prosper through value-added products. He also has given recognition to the success of our cooperative as an example of how many, working together for a common goal, can build a future for the next generation.

Michigan Sugar Company hosted Michigan Governor Rick Snyder for a facility tour followed by a meet-and-greet at our Bay City Factory.
Photos by Karen Gerhardt, Sister Studio.

Ray VanDriessche, Michigan Sugar Company's Director of Community and Government Relations, is also a third-generation farmer in mid-Michigan. He travels to both Lansing and Washington D.C. often to follow and advise on political activity that will affect agriculture in Michigan.

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Get to Know Our Board Members

by Julie Perry, Executive Assistant of Administration

Ben Booms, of Harbor Beach, Michigan, was elected to the Michigan Sugar Company Board of Directors in January of 2009. He represents the North Region of the East District.

Ben, along with his wife, Judy, his dad, and some part-time help, raises 300 acres of sugarbeets, with a total acreage of around 1,000. They also grow dry beans, corn, wheat, and feed out 300 head of cattle annually. Theirs is a fourth generation farm. They have been growing sugarbeets for 22 years.

The Booms have four children; Kristie, 25; Jolene, 24; Bradley, 21; and Richard, 18. Jolene has been married to Ray Wolschleger for three years; Kristie is engaged to Jared Jurgess; Bradley is engaged to Camay Messing; and both couples are planning weddings in 2014! Richard attends Delta College with a focus on Construction Management. He also assists on the farm when time in his schedule allows.

Ben says of his operation, "Sugarbeets are an important part of our farming business, as they help spread the risk. We have also had excellent yields."

In addition to farming, Ben has served on the Sand Beach Township Board of Review, St. Anthony Men's Club and Parish Council. He enjoys bowling and likes to snowmobile with family and friends.

Ben Booms enjoys spending time with his family; Back Row: Ray and Jolene Wolschleger, Camay Messing and Bradley Booms, Judy and Ben Booms; Front Row: Jared Jurgess and Kristie Booms, and Richard Booms.

Jeff Gulick, of Merrill, Michigan, was elected to the Michigan Sugar Company Board of Directors at its annual meeting in January. Jeff represents Region 2 of the West District, replacing Mike McCormack. He had previously been a director on the Founding Board of Michigan Sugar Company when the cooperative was formed in 2002.

Jeff is a fifth generation farmer who has been married to his wife, Denise, for 28 years. She works outside the home in the Human Resources Department of the St. Louis Correctional Facility. They have two sons, Nathan and Josh, who help with the farm operation. Josh graduated from Michigan State University and works for Auburn Fertilizer. He is in Michigan Sugar Company's Young Farmer Program and is getting married soon. Nathan also graduated from MSU and works with Jeff on the farm. Jeff refers to Nathan as his "tech guy."

The Gulick farm is located near the Breckenridge area, and they have 2,300 acres, of which 400 are grown to sugarbeets, and the balance in corn, soybeans, and wheat. They also raise 10,000 head of hogs annually, from wean to finish. Jeff raised his first sugarbeets in a 4H Youth Program. He purchased his farm in 1984.

Jeff and Denise feel they are moving into the next chapter of their lives, after raising their sons. They enjoy snowmobiling and spending time at their cabin on Lake Margrethe in Grayling.

Jeff says, "Sugarbeets make farming interesting and challenging. They are consistently profitable."

He is very passionate about the sugarbeet industry. He says, "I am excited about what we started in 2002; where we went, and where we are going. That's why I wanted to be back on the Board. I am a beet farmer — that's who I am and what I do."

Jeff Gulick enjoys snowmobiling and spending time at their cabin on Lake Margrethe in Grayling.

Julie Perry is the Executive Assistant of Administration and Editor of *The Newsbeet* at Michigan Sugar Company. She has been with the company for 16 years.

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Considering Safety When Planning Pesticide Use

by John Stone, Michigan State University

Resistance by Cercospora leafspot to some fungicides that once controlled it shows the importance of using fungicides with several different modes of action in an effective control plan.

Recommendations to rotate applications of several classes of fungicides separately, or in combination during the growing season, mean the grower is challenged to be aware of numerous fungicides, and their risks, in order to protect the plants. The range of risk to the applicator and the environment among the classes of fungicides used to control Cercospora leafspot is important to remember as choices are made for the next growing season.

Let's review some of the basics of safe handling, mixing, loading, and application of pesticides. The pesticide label is the source of information necessary to be safe when using and applying a product.

First is to know the pesticide's **Use Classification**. A General Use Pesticide will have a lower risk than a Restricted Use Pesticide. A pesticide is given a Restricted Use classification if it has a significant risk, usually toxicity, to people or the environment.

Next is a pesticide's **Signal Word**. The Signal Word is a relative guide to the toxicity of the pesticide. Lowest risk products are assigned the word "Caution." The next risk level products are assigned the word "Warning." The word "Danger" is assigned to products with a particularly high risk in either the active or inert ingredient to the applicator or individual doing the mixing and loading. The highest risk products are assigned the words "Danger-Poison."

Signal Words also give indication of Personal Protective Equipment (PPE) needed when using the product. Super Tin, for example, is a Danger-Poison Restricted Use pesticide; and requires application by aircraft or enclosed cab to protect the applicator.

Pesticide registrants are working to develop combination products to lower risks associated with tank mixing several products; however, tank mixing may still be necessary. Labels may or may not have information about tank mixing. The greatest risk in tank mixing is incompatibility of the formulations. Incompatibilities can result in an inactivation of the active ingredient; a separation or settling in the tank, or creation of a new substance that will not flow through the spray equipment. If a label prohibits a certain tank mix, it is usually because the registrant has tried this mix and found one of these incompatibilities. A **Jar Test** can also be done to determine if a tank mix will not have incompatibilities. A Jar Test is making a smaller version of the tank mix in a glass jar and observing what happens over one half to one hour. Changes in color, settling of particles, heat, curdling (a cottage cheese-like substance forms) or fume emission are indicators of incompatibilities.

New Pollinator Protection guidance will be part of labels of pesticides identified as possibly having an adverse effect on bees and other pollinators. This will appear in the Environmental Hazards section of the label. Look for the image of a bee in a diamond symbol. Some researchers are reporting a possible fungicide component in the colony collapse puzzle. Labels produced after February 1, 2014, will have the symbol and guidance.

Finally, check the WPS portion of the label for reentry after application (REI) and posting information. A crop consultant or other farm personnel entering a sprayed field are covered under WPS.

There are many resources to assist you in making safe and compliant applications to protect your sugarbeets. Dealers, MDARD staff, MSU Extension Specialists and the MSU Pesticide Safety Education Program welcome your questions and are ready to serve you.

John Stone, Coordinator of the Pesticide Safety Education Program at Michigan State University, serves as an Academic Specialist with the MSU Department of Entomology. He also is an instructor at Michigan State University and the MSU Institute of Agricultural Technology's Grand Rapids Landscape and Lawn Management Program.

GETTING READY FOR 2014: Managing Cercospora Leafspot

by Greg Clark, Agronomist

The 2013 growing season is behind us and now we need to start planning for the 2014 season, and it is imperative to consider the increasing number of fungicides that are becoming resistant (e.g., Headline, GEM, and Topson) to Cercospora leafspot (Graph 1, page 14).

Resistance is a genetic alteration (mutation) by a fungus that results in reduced sensitivity to a fungicide. Decreased sensitivity is thought to be a result of genetic mutations which occur at low occurrences or of naturally occurring sub-populations of resistant individuals. Michigan State University confirmed strobilurin resistance in Michigan in 2011. Image 1 shows the difference between insensitivity (resistance) and sensitivity (non-resistance) from two different fungicide classes by using a sugarbeet agar on spiral plating (Michigan State University, 2013).

A question that you may be asking yourself is what order of fungicides will become resistant first? Below is the sequence for fungicide classes that would become resistant first with number one being the top fungicide class for not controlling a pathogen. Numbers five and six would be considered a tie and last to become resistant due to their multi-modes-of-action.

1. Benzimidazole (Topsin)
2. Strobilurin (Headline, Gem)
3. Organo tin compounds (Super Tin, Agri Tin)
4. Triazole (Inspire XT, Enable, Eminent, TOPGUARD, Proline)
5. Coppers (Kocide, Cuprofix)
6. Ethylenebisdithiocarbamate 'EBDC" (Mancozeb, Dithane, Penncozeb)

Michigan Sugar Company has recommended several management practices over the years and it is time to look at them again as a refresher, thus slowing down the development of fungicide resistance, which includes:

- **The use of more tolerant varieties.** Tolerant varieties are especially important when planting next to a field that had Cercospora problems the previous year, or if planting in an area surrounded by trees, which results in conditions favorable to Cercospora. Note: One must weigh out the options of higher producing varieties with low leafspot tolerance vs. lower producing varieties with high leafspot tolerance.
- **Do not rely on only one class of fungicides to control plant diseases.** Fungicides from different chemistry classes can be mixed together to reduce the selection pressure on the fungal population. Applying mixtures of fungicides with different modes of action can help reduce the selection pressure placed on the pathogen population compared to using only a single product.

continued on page 14

Image 1: *Strobilurin resistance (top picture) and Triazole with normal sensitivity (bottom picture).*

Graph 1: **Cercospora Efficacy Trial • Elkton, MI**

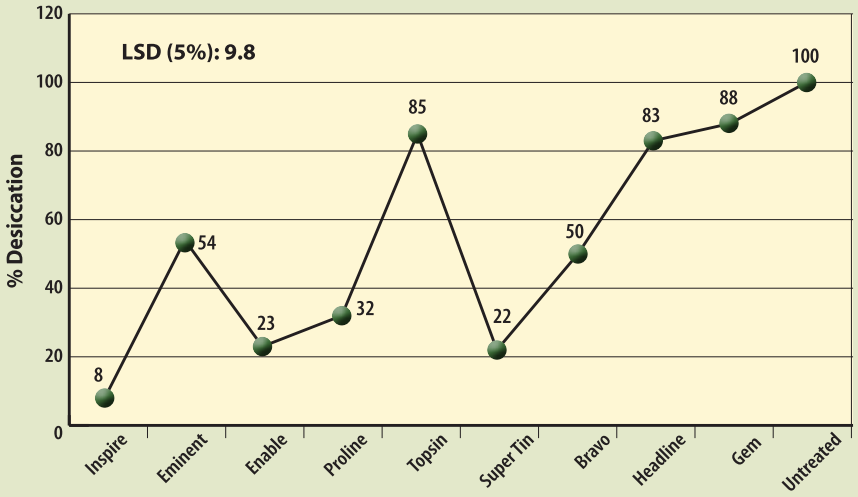
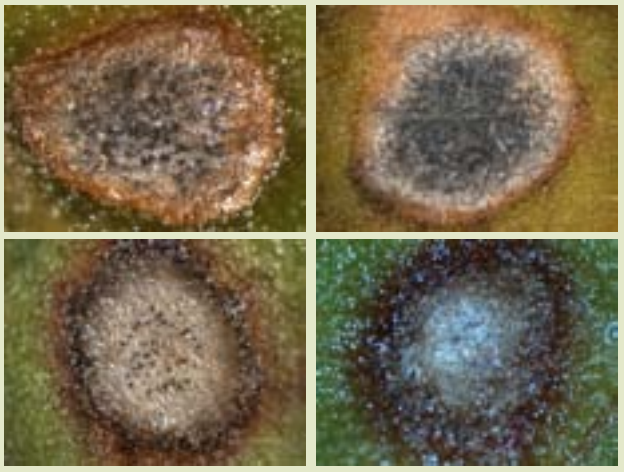


Image 2: *Magnifications of Cercospora leafspot (Cercospora beticola)*



Managing Cercospora Leafspot, continued from page 13

- **Apply foliar protectant fungicides only to control plant pathogens.** Do not apply them for other reasons. Every time a fungicide is applied, it utilizes a selection pressure on fungal isolates and these isolates may be selected that are not as sensitive to the fungicide as they used to be. Preserving this selection pressure to a minimum is important in prolonging the effectiveness and duration of a fungicide.
- **Properly identifying Cercospora leafspot (Image 2).** In 2013, Cercospora leafspot isolates were low, due to dry conditions. The development of disease is highly dependent upon the presence of tolerant varieties, adequate inoculum and environmental conditions depicted by periods of high humidity or leaf wetness periods longer than 11 hours and night temperatures exceeding 60°F and day temperatures are between 75° F and 85°F.
- **Follow the label.** Use recommended rates along with spray schedule and obey restrictions. When sub-lethal doses of a fungicide are applied, the risk of fungal pathogens becoming more tolerant to the fungicide is increased.

Fungicide resistance management is important in the production of sugarbeets and all other crops. You will reduce the risk of a fungal pathogen developing resistance to a fungicide by taking the steps outlined in this article. The bottom line is that tank-mixing or rotating different modes-of-action will reduce the possibility of diseases developing resistance to them. The resistance risk is especially high with site-specific products. However, by properly rotating products, carefully following the label, and using fungicides with different classes of fungicides, disease and fungicide resistance can be carefully and effectively managed. ▮

Greg Clark *is an Agronomist at Michigan Sugar Company. He has 15 years of experience in agronomy. He specializes in entomology, plant physiology, and plant pathology. Greg joined Michigan Sugar Company in October 2010.*

GROWER'S CERCOSPORA RESISTANCE MANAGEMENT:

THE GOOD THE BAD AND THE UGLY

It has been well documented that research from Michigan State University, University of Guelph, and Michigan Sugar Company has shown Cercospora resistance to strobilurin fungicides is widespread in both Michigan and Ontario. Recent research in Ontario has shown almost complete resistance to benzimidazoles (Topsin/Senator) along with strobilurins. This has occurred partly because of a lack of: available fungicides with different modes of actions, chemistry rotation and tank mixing. In Michigan, varying degrees of strobilurin effectiveness have been shown. Because of this, strobilurins are no longer considered the mainstay in our leafspot fungicide spray program. Efforts must be put forth to protect the existing fungicides that are available.

The Sugarbeet Advancement program has worked closely with grower management practices since 1997. When conducting trials, management information is collected including fungicide materials and applications. Over the last three years, some general trends have emerged which I will call the good, the bad and the ugly in producer resistance management practices.

The Good:

Most growers rotate fungicide classes and utilize BEETcast as part of their strategy for applying fungicides. Growers are commonly using BEETcast to time the first application and using a combination of DSVs and product labels to time subsequent applications. Most applicators are using the recommended spray rates, pressure and volume of water. From three years ago, tank mixing fungicides have increased and strobilurin use has decreased. If a strobilurin is used, it is generally not used more than once and is usually tank mixed with another fungicide. Alternative fungicide usage, such as Tin, has increased in the last few years from almost none. According to a survey during the winter grower meetings, in 2012, 16% of growers used Super Tin and an additional 18% planned to use it in 2013.

The Bad:

Tank mixing fungicides is very important in resistance management. In 2012, Sugarbeet Advancement (SBA) variety trial cooperators tank mixed about 59% of their total fungicide applications. This number dropped to 35% in 2013. The decline mainly stems from the poor mixing capabilities of the EBDCs and coppers. They are slow to mix and tend to coat the inside of spray tanks. Our most effective fungicides (triazoles) need to be tank mixed with alternative fungicides to protect them from becoming resistant. This is especially important if triazoles are going to be used more than once in a program.

Though Tin usage has increased a small amount, it is highly recommended to be included in growers' resistance management programs. This is a very effective fungicide and offers an alternative mode of action. It is widely and safely used in the Red River Valley and has worked well to help them minimize Cercospora resistance. Without its inclusion, we are certain to develop resistance to our triazoles at a faster pace.

Some growers are stretching spray intervals. Too long between fungicide applications allows Cercospora to establish a foothold and increase spore development. By not applying a late fungicide application, those surviving spores (some of which may be resistant) are allowed to propagate and will be a problem the next time beets are planted. Producers are encouraged to tighten spray intervals according to the fungicide label and/or follow Michigan Sugarbeetcast recommendations for each zone.

The Ugly:

In 1998, the Red River Valley experienced a loss of over $75,000,000 due to Cercospora resistance to fungicides. This disease was virtually uncontrollable because of resistance. Complete burn down of foliage caused reduced tonnage and poor quality beets. Currently, in the Great Lakes growing region we have had Cercospora resistance to Topsin (benzimidazoles) for quite some time and more recently increasing resistance to strobilurins. Our most effective products now are the triazole fungicides followed by Tin. Losing the triazoles will truly be the ugly. To protect the long-term efficacy of the triazole fungicides, tank mixing other fungicides such as EBDCs is required. The decision to include the EBDC is as much about protecting these chemistries for tomorrow as it is about improving control today. Triazoles should never be applied back to back or more than twice in a season, even if they are tank mixed with an EBDC. Tin fungicides offer a completely different mode of action and should be part of a grower's Cercospora management program. ■

Steve Poindexter *is the Senior Sugarbeet Educator with Sugarbeet Advancement, MSU Extension. Steve has been the Director of Sugarbeet Advancement for 15 years.*

Resistance Management in Research Trials

by Jim Stewart, Director of Research

Official Variety Trials

The main focus of the Research Department is in conducting the Official Variety Trial (OVT) program. The OVTs are designed to identify and "approve" sugarbeet varieties with higher yield and quality and with improved disease traits. Each year, seed companies send us new "experimental" varieties that they believe will be superior to our current varieties. Highly productive fields with low disease pressure are utilized for the OVTs so that yield and quality differences will not be influenced by disease or other problems. The trials are carefully managed, especially with respect to Cercospora and Rhizoctonia control.

It is critical to manage Cercospora leafspot in the OVT trials. On average, the most tolerant (Cercospora) variety in an Official Variety Trial is around ten times more tolerant to Cercospora than the most susceptible variety. Our goal is to manage the trials so that the most susceptible variety does not experience yield or quality losses due to Cercospora. From past work, we know that the yield and quality of sugarbeets is not affected unless leaves have at least 50 to 100 spots (Images 1 and 2).

For OVT trials, we begin our Cercospora spray program at around 50 to 55 DSVs which is about the first week of July. Repeat applications are made at approximately 40 DSV's which is about every 20 days. Most years we will make four-spray applications. The initial application (and the third application) will be a triazole fungicide (Inspire, Eminent, Proline, Topguard or Enable) in tank mix with an EBDC (Dithane or Manzate). The second and fourth applications are normally Super Tin. Our sprayer has a 38-foot-wide boom that delivers 24 gallons of water per acre (8002 XR nozzles at 100 psi and at 3.5–4.0 mph). We spray across the rows, not down the rows, and drive in buffer areas between the plot ranges. This decreases tire damage and compaction in the test plots. Our last spray application is usually the first or second week of September, unless the trial is to be harvested early.

Cercospora leafspot control in the Official Variety Trials has been very good. During the annual Breeders Tour in early September, we rarely receive complaints about Cercospora control. The OVTs are extremely important to the seed companies, because the trial results determine which varieties can be planted in Michigan and Ontario. Seed company breeders do not hesitate to criticize us about the condition of the trials; however, the OVTs are normally in very good condition and it is not unusual for the plant breeders to tell us that our OVTs are the best in the country.

Agronomic Trials

Agronomy trials focus on production practices such as nitrogen management, sugarbeet populations, row spacing, planting date, harvest date, weed control, disease control, insect control, seed treatment, etc. Our approach to controlling Cercospora leafspot in agronomy trials is different than for the OVTs because most Agronomic trials have only one variety. The aggressiveness of the spray program depends upon variety tolerance and the location of the trial (Red, Yellow or Green Zone). Regardless of the spray program, we still follow a sound resistance management program similar to the OVT spray schedule.

Cercospora Leafspot Trials

In conducting Cercospora leafspot trials, our main focus has been on application timings (BEETcast), fungicide resistance (Headline and Gem), new fungicide development such as Topguard and Bravo and tank mixing for resistance management. When conducting Cercospora trials, the spray schedule is determined by the trial protocol. If we are evaluating new fungicides, the spray schedule would be similar to our recommendations for growers. BEETcast trials normally have treatments that are less aggressive and more aggressive than the standard recommendation. At times, we want to "stress" the treatments and may begin applications later than recommended or apply fewer applications than normal.

Recent trials have shown that Inspire and Topguard are the most effective fungicides for controlling Cercospora followed by Eminent, Proline and Enable (all triazole fungicides). Super Tin has also provided good control. The EBDCs are less effective and are slightly more effective than Copper. We have determined that Cercospora has developed resistance to strobilurin fungicides (Headline and Gem) and Topsin M. When tank mixing for resistance management, we have also found that the tank mix treatments provides better Cercospora control.

Fungicide application timings are continually being revised due to changes in variety tolerance and because of issues like Cercospora resistance to fungicides. Application timings are based on the Cercospora risk zone, variety tolerance, and the choice of fungicides. In general, a 50/40 DSV program in Red Zones, a 55/45 program in Yellow Zones and a 60/50 program in Green Zones has worked well. Detailed information about fungicide timings can be found in the Grower Guide.

Research trials in 2011 indicated that Cercospora was developing resistance to strobilurin fungicides (Image 3). Additional field research and laboratory leaf analysis has confirmed that resistance problems are widespread. Greg Clark, Michigan Sugar Company Agronomist, is continuing to coordinate a resistance monitoring program for all of the fungicides that we use on sugarbeets.

***Jim Stewart**, Director of Research, coordinates the agricultural research activities at Michigan Sugar Company and specializes in weed, disease and pest control, soil fertility, and other sugarbeet production practices. He has been employed with the company for 14 years.*

Image 1:
Leaf with 20 to 30 spots (1% leaf damage), this level of Cercospora does not cause yield or quality losses.

Image 2:
Leaf with between 100 and 200 spots, (3% to 4% leaf damage), this level of Cercospora will cause about 1 ½ tons yield loss and up to ½ point sugar loss.

Image 3:
Small plot trial showing Cercospora resistance to strobilurin fungicides. Triazole (Inspire, Proline, Eminent) and SuperTin treatments are giving over 95% Cercospora control compared to about 50% control with strobilurin (Headline and Gem) treatments.

Figures 1 a-f

Proportional distribution of sensitivity of isolates of Cercospora beticola from Michigan and Ontario, Canada in a range of EC50 categories to different fungicides from 2006 to 2012; a) tetraconazole, b) prothioconazole, c) difenoconazole, d) thiophanate-methyl, e) triphenyltin OH, f) pyraclostrobin.

Monitoring and managing fungicide resistance in populations of Cercospora beticola in Michigan

by Willie Kirk, Noah Rosenzweig and Qianwei Jiang, Michigan State University
Linda Hanson, Michigan State University/USDA-ARS, and Greg Clark, Michigan Sugar Company

Cercospora leafspot (CLS, Cercospora beticola) is the most serious foliar disease of sugarbeet in Michigan and Ontario. Management of CLS depends on timely fungicide applications, disease forecasting predictive models and the use of CLS-resistant sugarbeet varieties *(Jacobsen and Franc, 2009)*. Fungicides have a dominant role in the control of sugarbeet diseases, particularly CLS. There are significant economic barriers that prevent sugarbeet growers in Michigan from applying more than three fungicide applications to control CLS and commonly only single applications were made. One significant drawback to this approach has been the tendency to apply products with a single active ingredient. Several of the modern fungicides have highly specific single targets of activity. Using such products alone has led to the development of insensitivity to some fungicides previously recommended for control of CLS, most notably thiophanate-methyl (Topsin) reported by Wieland and Halloin (2001) and recently, insensitivity to the strobilurin group of fungicides was reported by Kirk et al (2012). In other growing areas, insensitivity has been identified to additional fungicides, such as the sterol demethylation inhibitors (DMIs) (Karaoglanadis et al, 2000). The sensitivity of the population of C. beticola in eastern Michigan and Ontario to fungicides such as triphenyltin OH (Super Tin®); thiophanate-methyl (Topsin®); pyraclostrobin (Headline®) and tetraconazole (Eminent®) has been monitored in a joint program between Michigan State University (MSU) and the Michigan Sugar Company (MSC) since 2003. The type of survey used in the MI/ON sugarbeet region is designed to test a wide range of leafspot lesions from 100 to 120 locations/year. This method can quickly detect if there are any changes in the population of C. beticola and further analyses of the effective concentration of fungicides can then be done by EC50 determination (the concentration of fungicide required to prevent development or growth of spores or mycelium by 50%) value determination and DNA-based tools such as PCR for detection of gene changes known to confer fungicide resistance.

Summaries of the results from the survey from recent years are shown in **Figures 1a-f** (see right). The EC50 values measured for each isolate were calculated by regression analysis of the percentage spore germination vs. the log fungicide concentration. The EC50 values are grouped and generally the sensitive isolates group in the lower EC50 values and the less sensitive in the higher EC50 values.

The insensitivity response of the population of C. beticola to fungicides has fluctuated drastically from 2003 to 2013. There have been no reports of field failure of the triazole products (Eminent®, Proline®, Inspire®) in MI/ON although there is evidence that isolates of C. beticola with reduced sensitivity are present in MI/ON. However, growers recently have reported loss of efficacy when strobilurin products were applied particularly in years when CLS was severe. This prompted us to test whether we could determine how insensitive populations were from field samples. The fingerprint pattern of strobilurin-insensitivity is shown in **Figure 2** where there were mixed populations of insensitive and sensitive isolates in proportionate ratios from 1:99 to 60:40. The gradual appearance of the two middle bands indicates both the presence and an increase in the amount of strobilurin-insensitive isolates in the sample. The distribution of insensitive isolates throughout the growing area in the season of 2011 was shown in **Figure 3.** Strobilurin-insensitivity was widespread throughout the growing area.

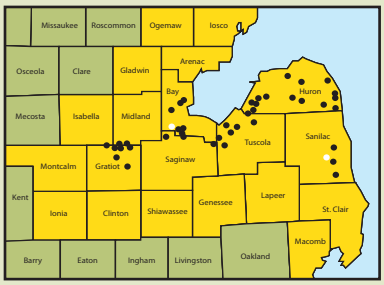


Figure 3: *Distribution of strobilurin-insensitive isolates throughout the growing area, 2011 season. ●= strobilurin-insensitive isolates; ○ = strobilurin-sensitive isolates.*

In 2013, several growers used strobilurin products in Michigan and did not report loss of efficacy, however CLS was not generally severe in the growing area. In MSU trials, CLS was not well controlled by strobilurins applied alone although there was some efficacy supporting the notion of mixed sensitivity populations. Where Headline® was incorporated into 4-treatment programs, efficacy was apparently not impacted and may have been enhanced by other products used in the programs (Table 1, page 18). Topsin® and Super Tin® are not recommended as stand alone products and it is therefore difficult to determine loss of field efficacy although in small plot trials this has been reported.

Management of CLS strains that are insensitive to fungicides (CLSi) can be achieved using timed fungicide programs with mixtures of protective fungicides. Over the past few years trials at MSU and MSC have shown that programs that incorporate triazoles such as Eminent®, Proline®, Inspire® and now Topguard® in mixture with EBDC fungicides (e.g. Manzate®, Penncozeb®) or copper products (Kocide®, Badge®) alternated with Super Tin® in mixture with EBDC fungicides provide excellent control of CLSi. Some results are shown in Table 1. However, Super Tin® cannot be used in ON and growers should therefore use the copper option.

MSU and MSC have endeavored to provide growers with early evidence of fungicide insensitivity and recommendations for managing these populations. Growers in MI/ON could adopt some of the programs shown in Table 1 and MSC and MSU are confident that adoption of these programs will enable growers to effectively manage CLS strains that are insensitive to fungicides. ■

continued on page 18

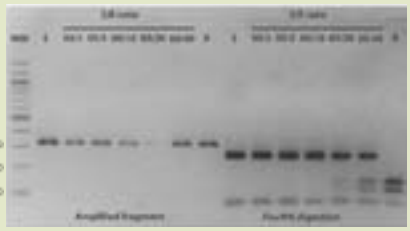
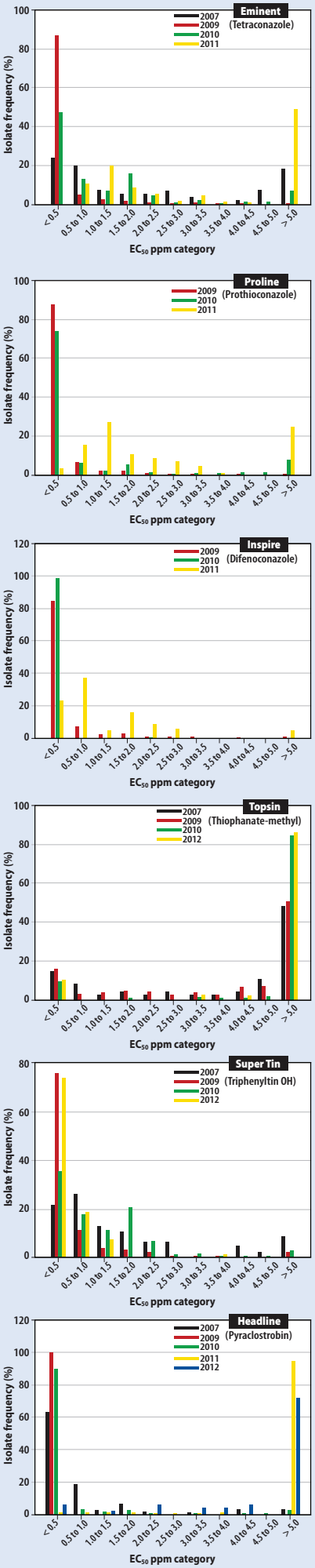


Figure 2: *Sensitivity of the allele-specific PCR-RFLP method. DNA extracted from QoI-QoI-sensitive (S) and resistant (R) isolates were mixed at different ratios (from 1:99 to 60:40) prior to PCR of the 325-bp-long amplified fragment of the cytochrome b gene. The 100% sensitive (S) and 100% resistant (R) corresponded to DNA extracted from mycelium a QoI-sensitive isolate and the QoI-resistant isolate, respectively. Size of standards based on a 100 bp DNA ladder (MW).*



Monitoring and managing fungicide resistance in populations of Cercospora beticola in Michigan

continued from page 17

Table 1. **Efficacy of fungicides and fungicide programs against Cercospora Leafspot (strobilurin-insensitive population). Extract of data form MSU Cercospora leafspot control trials at Richville, MI 2013.** ***Full report appears in MSU SVREC report for 2013.***

TREATMENT AND RATE/A	CERCOSPORA LEAFSPOT						YIELD (t/A)		RWSA[d] (lb)	
	SEVERITY (%) 18 Sep 19 DAFA[a]		RAUDPC[b] (0-100) 29 Aug		Bayer 0-10 scale[c]					
Proline 480SC 5.7 fl oz ACEG[e]…..	3.8	I	7.5	k-n	4.5	kl	19.6	b-l	5483	d-m
Eminent 11.6SL 13 fl oz (ACEG)….	4.3	kl	9.9	h-n	5.5	h-l	19.3	c-m	5061	f-o
Inspire XT 2.08SC 7 fl oz (ACEG)…	4.3	kl	7.0	lmn	4.3	l	20.4	a-j	5493	d-l
Topguard 1.04SC 10 fl oz (ACEG)…	5.3	Kl[f]	8.6	j-n	5.5	h-l	22.2	a-f	6175	a-g
Inspire XT 2.08SC 7 fl oz + Dithane F45 4F 51 fl oz + NIS[g] (A); Super Tin 4L 8 fl oz + NIS (C); Priaxor 4.17SC 7 fl oz + NIS (E); Enable 2F 8 fl oz + NIS (G)……	6.3	kl	10.5	h-n	6.3	f-j	19.9	b-k	5668	c-k
Eminent 125SL 13 fl oz + Diffusion 60L 2 gal/a (A); Super Tin 4L 8 fl oz + Diffusion 60L 2 gal/a (C); Topsin 4.5FL 10 fl oz+ Diffusion 60L 2 gal/a (E); Headline 2.09SC 12 fl oz + Manzate Prostick 75DF 32 oz + Diffusion 60L 2 gal/a (G)……	6.8	jkl	11.6	g-n	6.0	g-k	24.0	a	6812	abc
Eminent 11.6SL 13 fl oz (AG); Super Tin 4L 8 fl oz + NISg(C); Topsin 4.5FL 7.6 fl oz + Manzate 75WG 2 lb (E)……	12.5	i-l	16.0	f-i	7.0	e-h	18.5	g-o	4970	g-o
Tilt 3.6EC 4 fl oz (ACEG)……	21.3	hi	14.6	f-j	8.0	b-e	19.4	b-m	5406	d-n
Enable 2F 8 fl oz (ACEG)……	37.5	fg	26.1	de	8.8	a-d	17.9	g-p	5008	g-o
Super Tin 4L 8 fl oz (ACEG)……	38.8	efg	25.7	de	8.8	a-d	17.3	i-p	4699	k-o
Headline 2.09SC 9 fl oz (ACEG)…	60.0	bc	27.7	cde	9.5	ab	15.9	l-p	4329	l-o
Not treated check……	87.5	a	47.9	a	10.0	a	14.4	p	4215	no

[a] DAFA= Days after final fungicide application

[b] RAUDPC = The relative area under the percentage late blight disease progress curve calculated for each treatment from the date of the first evaluation to 29 Aug, a period of 33 days (Max = 100)

[c] Foliar leafspot severity; 0 - 10 scale; 0= 0%; 1 = 1 - 5, 0.1%; 2 = 6 -12, 0.35%; 3 = 13 - 25, 0.75%; 4 = 26 - 50, 1.5%; 5 = 51 - 75, 2.5%; spots/leaf or severity %; respectively; 6 = 3% (proven economic damage); 7 = 6%; 8 = 12%; 9 = 25%; and 10 > 50% severity

[d] RWSA = Recoverable White Sucrose per Acre (Ton/A* Recoverable White Sucrose per Ton of sugarbeet)

[e] Application dates: A= 12 Jul; B= 19 Jul; C= 26 Jul; D= 2 Aug; E= 9 Aug ; F= 16 Jul; G= 23 Aug; H= 30 Aug.

[f] Means followed by same letter are not significantly different at p = 0.05 (Fishers LSD)

[g] Induce applied at 0.25% v/v

Acknowledgments

Agriculturists from Michigan Sugar Company who assisted in collection of samples.

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RESISTANCE MANAGEMENT:

How can we resistance in

by Christy Sprague, Weed Extension Specialist •

The commercialization of Roundup Ready® sugarbeets has been one of the greatest advancements in weed management for sugarbeet growers. This system has provided growers with the ability to control several different weed species without the crop injury or reduced weed control that were once often the result of traditional weed management practices. In fact, since the commercialization of Roundup Ready® sugarbeets, sugarbeet yields in Michigan have been at an all-time high. However, the evolution of glyphosate (Roundup®)-resistant weeds is threatening this technology for many Michigan sugarbeet growers.

Glyphosate/multiple-resistant weeds in Michigan

Currently, there are three different weed species in Michigan that have been identified as resistant to glyphosate. In fact, some of the populations of these weeds are not only resistant to glyphosate (Group 9), but also resistant to the ALS-inhibiting herbicides (Group 2), therefore they are multiple resistant. The weeds that have been confirmed resistant to glyphosate and in many cases are multiple resistant are horseweed (marestail), common waterhemp, and Palmer amaranth. Strategies to manage these weeds in sugarbeets are going to be difficult and in many cases will be of great expense.

Horseweed that was sprayed with Roundup PowerMax® in a Michigan sugarbeet field.

Glyphosate-resistant horseweed

Glyphosate, and, in some cases, multiple-resistant horseweed currently is the biggest problem for many of Michigan's sugarbeet growers. This winter annual weed has initial emergence in the fall and early spring. However, horseweed seedlings can emerge even after the sugarbeet crop has been planted. This weed seems to be more of a problem in sugarbeets planted into stale seedbed fields. While there are no perfect options for control of this weed, horseweed is the one glyphosate-resistant weed species that we may have a better chance managing in sugarbeets. This past year, we conducted some initial herbicide screens in the greenhouse and field. From this work we know that we can have good control of glyphosate-resistant horseweed with Stinger (Group 4). However, control with Stinger was rate dependent and will likely be size dependent.

manage herbicide weeds in the future?

Department of Crop and Soil Sciences, Michigan State University

From our work, Stinger applied at 2 fl oz/A was not very effective, even if it was applied twice, two weeks apart. From the rates that we examined, ***4 fl oz/A or more of Stinger*** was needed to control glyphosate-resistant horseweed. Stinger could be tank-mixed with glyphosate + AMS or applied alone. In the future, we will continue to examine different strategies to manage this weed.

Common waterhemp, Ionia County soybean field

Multiple (glyphosate/ALS)-resistant common waterhemp

Common waterhemp is a pigweed (Amaranthus) species that is not very common in Michigan. However, over the last couple of years we have identified populations of this weed in Isabella and Wayne counties that were resistant to both glyphosate and ALS-inhibiting herbicides. This year we also had reports of waterhemp in Gratiot County near a sugarbeet field that was feared to be glyphosate-resistant. Fortunately the grower identified the weed early and was able to rogue it out prior to seed production. We also sampled several fields in Ionia County that we believe are both glyphosate and ALS-resistant. Multiple-resistant waterhemp is currently one of the greatest challenges for many Midwest corn and soybean growers. This weed has the potential to be one of the most troublesome for Michigan sugarbeet growers.

Multiple (glyphosate/ALS)-resistant Palmer amaranth

Palmer amaranth has been identified in nine Michigan counties (Figure 1). Populations of this weed are resistant to glyphosate and ALS-inhibiting herbicides, leaving very few herbicide options available for management of this weed. This non-native pigweed species is very similar to common waterhemp. However, it is probably the most aggressive and devastating of the pigweeds. Palmer amaranth's ability to emerge throughout the growing season, rapid growth rate, prolific seed production, and its propensity to evolve herbicide resistance quickly makes this the biggest weed threat that Michigan farmers, especially sugarbeet growers, have ever faced.

The best way to manage both common waterhemp and Palmer amaranth is to never let them become estalished. Proper identification of these weeds from many of our native pigweed species is critical. It is essential for all growers to scout for common waterhemp and Palmer amaranth in their fields. Palmer amaranth scouting efforts should be targeted in Roundup Ready® fields that have been spread with manure in the past couple of years. If initial glyphosate applications are not controlling pigweed, it may be common waterhemp or Palmer amaranth. It is important to get confirmation of this early to allow for potential management with herbicides or hand-weeding prior to seed production. Remember one female plant of common waterhemp or Palmer amaranth can produce an average of 100,000 to 400,000 seeds. In many cases if these weeds are identified early in their first year of establishment there may only be a few plants scattered throughout the field. Early identification and removal of these weeds before they produce seed and are spread throughout the field is extremely important. To help with the identification of common waterhemp and Palmer amaranth, we have developed fact sheets and a video clip that can be found on our website http://www.msuweeds.com/.

Palmer amaranth, Gratiot County soybean field.

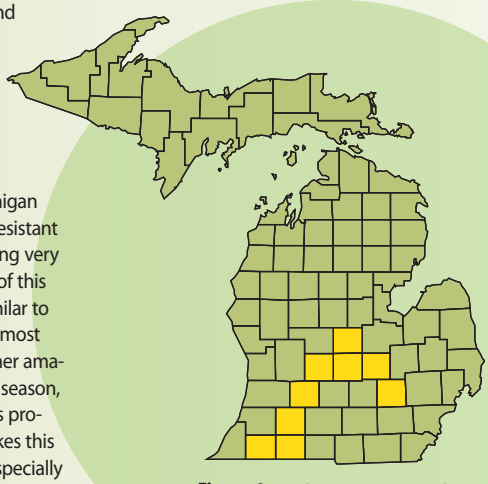


Figure 1. *Michigan counties where Palmer amaranth has been identified.*

Practices to reduce the evolution of herbicide-resistant weeds

While herbicide-resistant weeds may not yet be present in any of your fields, following the practice of continuous use of any herbicide including glyphosate without other weed control strategies will most likely lead to the evolution of herbicide-resistance. So how do we slow down the development of herbicide-resistant weeds? **DIVERSITY IS KEY!!!** Whether it is diversity in tillage, herbicide use, or cropping systems utilizing diversity is one of the main strategies to slowing down the development of herbicide-resistant weeds. Below are six main strategies that should be followed to help reduce the development of herbicide-resistant weeds.

- **Rotate herbicides with herbicides that have different sites of action.** Herbicide labels now list a herbicide group number that refers to the site of action of that herbicide. Herbicides with different numbers have different sites of action. These herbicide group numbers can also be found in the *MSU 2014 Weed Control Guide for Field Crops (MSU Extension Bulletin E-434).*
- **Apply herbicides with multiple sites of action in sequential, premixed, or tank-mixed applications**. Examples would include: applying a residual soil-applied herbicide preemergence before a postemergence application of glyphosate or tank-mixing another herbicide with glyphosate. In Roundup Ready® sugarbeets, tank-mixing Dual Magnum or Outlook with glyphosate will provide an additional herbicide site of action for control of grass and small seeded broadleaf weeds.
- **Scout for changes in weed populations.** Herbicide-resistant weed populations generally start with just a few plants. If they are identified within the first couple of years of development it is easier to manage the expansion and spread of these weeds.
- **Rotate crops, particularly with different life cycles.** Rotational crops offer different methods of weed management, whether it is different herbicides, planting dates, or tillage.
- **Use cultivation and other mechanical weed management practices, when appropriate.** While this practice may not be practical or feasible for every operation, it is a viable option for management of certain weeds. For example, preplant tillage would be an option to help manage winter annuals, biennials, and perennials that may develop resistance.
- **Clean tillage and harvest equipment before moving from fields infested with resistant weeds.** The movement of equipment from infested fields to other fields is the quickest way to spread herbicide-resistant weed seeds across and between farms.

While all of these principles apply to all herbicides, because of the widespread use of glyphosate for weed control in many of our Roundup Ready® crops, glyphosate currently is at the highest risk for the development of new herbicide-resistant weeds. While many of the strategies listed above may not fit in the sugarbeet year of the rotation, they should be implemented in other years of the rotation.

Dr. Christy Sprague *is an Associate Professor in the Department of Crop and Soil Sciences at Michigan State University. She earned her PhD in Crop and Soil Sciences from MSU in 1999, and joined the Department in 2003.*

Crop Records: It's a Win-Win!

by Paul Pfenninger, Vice President of Agriculture

And the winners are...

The real winners in the 2013 Crop Records contest are all of us who use Crop Records as a source of information to improve our bottom line. The information gathered and reported is a valuable source for our cooperative to improve our production and overall quality.

In 2013, we put additional focus and attention on asking all members to input their data into Crop Records. Then we gave $50, per field, to all growers who filled out their Crop Records in a timely fashion. Those same growers were entered into a drawing for a trip for two anywhere in the Continental United States. We had one general drawing for each district and the winners were announced at the Annual Meeting of each District.

Congratulations to our winners:

Paul Albosta - West District

Depcinski Farms - Central District

Timothy Demaray - East District

We still have a lot of room for improvement. Even with the incentives, only 62% of our membership (554/900) completed the necessary Crop Record information to qualify for the $50 incentive. We will continue to stress the need to improve our input going forward until we have a better buy-in to this effort.

As stated in the April 29 *Sugar Scoop*, and reported at your District Annual Meeting, following is a list of reasons why Crop Records are a critical tool for our Cooperative…

Strategic Importance

- Provide opportunity for continuous improvement in the amount of sugar per acre growers produce
- Capture of accurate and timely data from 163,000 acres annually will provide our cooperative with an invaluable database
- Analysis of the data will show which practices produce best results
  - Least expense, most accurate research database
- Implementation of "best practices" would have a substantial, positive impact on the beet payment
  - 1% increase in sugar content = +$5.00/ton increase in beet payment
  - 1 ton increase in yield = $1.00 increase in beet payment

Historical Analysis

- Ability to show progress made in adoption of "best practices"
- Ability to show improvements in stewardship of land
- Review of historical data for yield projections (marketing planning, harvest start, etc.).

Timeliness

- Allows Ag staff to make recommendations based on timely and accurate information
- Excellent means of communication

Customer Requirements

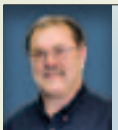
- Customers desire to know where and how our crop is grown and maintained, also known as "traceability" and "sustainability"

Your Board of Directors and Management are working toward full utilization by ALL members of our Cooperative. We will not release individual information, but we will use the information to track trends and help assist with the development of future research.

Take a minute or two to review the reports currently listed in Crop Records. **Go to www. michigansugar.com >> Agriculture >> Reports.** Take a look at the yield difference last year between reported acres in narrow rows versus 30" rows. Check out the performance of individual varieties commercially planted and compare your actual harvest data with the harvest data for the area covered by your agriculturist.

The information is very interesting and can be very useful. Let's make an effort to gather more information in a more timely fashion in Crop Year 2014.

The information our Crop Report gathers is a valuable source for our cooperative to improve our production and overall quality.



Paul Pfenninger, Vice President of Agriculture, *has been with Michigan Sugar Company for 32 years.*

Looking to the Future

ABOVE: *Heidi Bolger, Rehmann Consulting, presents Mark with the 2013 Michigan Sugar Company Young Farmer Award.*

by Mark Reif, Michigan Sugar Company 2013 Young Farmer of the Year

Young Farmer Program

The Michigan Sugar Company Young Farmer Program is a great venue for the younger generation of the Cooperative to voice concerns, state opinions, and ask questions in an open format amongst peers. The program encourages the kind of critical thinking necessary for the next generation to prepare them to one day take the reins and steer the Cooperative in the direction most conducive to growth, profitability, and sustainability. The demographic of farmers this program seeks to inspire has a skillset not previously attributed to the farming community. With this comes solutions and support for many issues and trends facing farmers today.

The demographic of young farmers has a skillset not previously attributed to the farming community. With this comes solutions and support for many issues and trends facing farmers today.

Technology

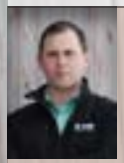
With increasing focus and dependence on technology, young farmers must be the tech support for their operation. The enormous amount of data that farmers are now collecting will be the basis of decision making in the future. The young farmer in your operation knows that the data being collected is only as good as the information being put in. Taking the time, up front, to input good information and set up parameters correctly will pay dividends down the road.

"Responsible Agriculture"

Public misconception of GMO cropping practices, misuse of pesticides, and excess nitrogen runoff are just a few issues the media and misinformed public are using to put a target on farmers' backs. "Responsible agriculture" is a term being used more and more and will be a challenge for any young farmer. Precision cropping practices such as variable rate nitrogen prescriptions, virtual field boundaries for overlap control, and electronic recordkeeping are just a few proficiencies a young farmer brings to the table that can have a significant impact on curtailing these issues.

Next Generation

Young farmers are being brought up in an increasingly volatile market. With turmoil surrounding both the Renewable Fuel Standard (RFS) and sugar program, it is clear to us that strong legislative presence is a must in all sectors of agriculture. The Michigan Sugar Company Young Farmer Program, and others like it, is essential for the next generation to be informed and learn how to get involved. Thank you for your support and I hope this helps to reaffirm and inspire your commitment to technology and the next generation.



Mark Reif, *one of the younger farmers active with Michigan Sugar Company, is also the recipient of the 2013 Young Farmer Award. He is also a member of the Saginaw County Farm Bureau and attended the 2013 MFB Young Farmer Leaders' Conference in Dearborn. The Reif family farm was established in 1928 in Saginaw County.*

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Bednarski Farms, Inc.

Tuscola County, Michigan

by Dexter Auernhamer, Agriculturist

Family, Farming and Planning for the Future

The Bednarski family has a long history of farming. Carl's father, Steve, farmed all his life, starting at the family farm south of Caro. He married, and purchased a farm in Columbia Township north of Caro. Carl, himself, began growing beets in 1987, with ten acres, for Michigan Sugar Company. At that time, beet acreage was maxed out so Carl felt he needed to show his commitment. He had a 12-row planter (28") and purchased a 4-row speedy topper and a John Deere 4310 harvester.

Bednarski Farms is now farming approximately 400 acres of beets. Carl has seen many changes since 1987, from farm and equipment size to the way technology has changed the way things are done on the farm. With the research that has been done on row widths, he decided that switching to 22" rows would benefit him, not only with his beet crop, but also in his other crops. Having the opportunity to farm a diversity of crops, such as corn, sugarbeets, soybeans, wheat and dry beans made the decision easier to switch to a 24-row, 22" planter. Carl currently harvests his beet crop with a 12-row topper, 8-row harvester, and a couple of carts.

Carl and his wife, Lisa, have three sons, CJ, Nathan, and Michael, who are interested and active in the agriculture sector. CJ, the oldest, worked at Tri County Equipment in Caro until last year when he joined the farm full time. He had always helped, even while working at his day job. Nathan is now also helping with the operation. Nate and CJ can typically be found working on equipment in their shop. Michael, the youngest, is attending Michigan State University in pursuit of an Agribusiness Management Degree. Michael is also active on the farm when he is home. All three of Carl and Lisa's sons were members of the 4-H youth program, where Carl himself served as a 4-H leader for approximately 14 years.

Carl is very involved with Farm Bureau, as a state board member. He started on the Tuscola County Board in 1989 and was elected to the state board in 2000, in the mid- 90s he was elected to the Caro District Grower Board of Michigan Sugar. Carl says anyone thinking about a leadership role, or getting on a board, should start at a local level where you have the opportunity to develop your leadership skills. Carl was elected to the Michigan Sugar Company Co-op Board in 2000 where he helped with forming our Co-op.

When talking about the future with Carl, it is clear he has a vision and desire of what he wants out of life. Carl clearly has a passion for farming saying, "I enjoy the lifestyle. Where else can you be your own boss and work with people that you respect and who respect you?" Carl loves the farming environment and stresses the fact that money isn't everything. "Raising a family with responsibility and a good work ethic is plenty."

Dexter Auernhamer is an agriculturist at Michigan Sugar Company in Caro. He joined the Company in February 2010.

***Above:** U.S. Sen. Debbie Stabenow speaks during a press conference in Frankenmuth in October 2012. Stabenow is joined by, from left, Sparta apple farmer Jim May, Julia Rothwell of Belding Fruit Storage and Caro farmer and Michigan Farm Bureau board member Carl Bednarski.*
Courtesy | Stabenow for U.S. Senate

***Above:** Carl's sons, left to right, Michael, CJ, and Nathan.*

***Above:** Sugarbeet harvesting on Bednarski Farms.*

The Michigan Sugar Festival: Celebrating 50 Years of Sweet Fun!

During a Chamber of Commerce meeting in early February 1965, then-President, Herb Gettel, opened a discussion about having a sugar festival in Sebewaing, one of the four towns in which Michigan Sugar Company had a factory. Chamber members gave immediate support to the plan and Sebewaing's new banker, Norman Schroeder, and the local editor, Walt Rummel, were designated to "put the question" to Michigan Sugar Company officials in Saginaw. The three, accompanied by Carl Hess, who was manager of the Sebewaing plant, spent a part of a day with company President, Ernest Flegenheimer, and Vice President, Max Henderson. The idea was a hit, and on March 4, 1965, the Sebewaing Chamber of Commerce voted to hold a Sebewaing Sugar Festival on July 2 and 3. A "sugar festival" offered a bonanza of promotional ideas: The Festival Queen would be "the sweetest girl in the world," decorations would center on sugarbeets and farming, and there would be a pageant about the early days of beet farming. And the purpose (something Al Hoeh preached for years) "To show the area's appreciation to the sugar industry which has purchased sugarbeet crops from farmers and processed sugar here with local employees since 1902."

June 6–15, 2014, marks the 50th anniversary, of what is now known as the Michigan Sugar Festival. The Chamber of Commerce still oversees the festival with the help of many organizations and volunteers. I have been involved either directly or indirectly for all 50 years. My earliest memories are of helping my father, Lloyd Kuhl, back the house trailer, donated by Henry Drettman, behind the stage to be used as a backdrop and a place for the entertainers to rest or change clothes. The trailer had to be pulled away from the stage after Saturday night's entertainment because the fireworks were set off in the outfield behind the stage, which was set up over second base. Dad got that job because he worked for Herb and his brothers, Clarence and Loren, as a salesman at their John Deere dealership, Gettels Inc.

When we started planning for the 50th anniversary, two years ago, one of the first thoughts that came to me was how interesting it would be to have as many of the different beet harvesters used over the years on display; from the original one-row beet lifter to the huge machines used today. I know they are out there. I see them sitting behind sheds and in fence rows. I've also seen some that have been restored.

Wanted for Display: Old and New Harvesters

I would like to have a variety of the harvesters that have been used over the years. I'm not expecting a new paint job, just a clean machine. If you have an old, or new, harvester and are willing to bring it to Sebewaing for the festival, please contact me. My email address is: mrkuhl502@yahoo.com.

If those harvesters could talk, I'm sure there would be some very interesting stories to hear. They can't, so plan on attending the 50th Michigan Sugar Festival and share their stories, and yours, with other farmers and visitors.

— Melvin R. Kuhl
Michigan Sugar Festival Chairman

***Left:** The 2013 Michigan Sugar Queen and her Court. The crowning is one of the special events at the Michigan Sugar Festival.*

How Sweet It Is!

East District • Bruce and Gail Maurer

The East District's High Sugar Producer for Crop Year 2013 was Bruce and Gail Maurer of Ruth, Michigan. The 27.56 acre field that Bruce harvested went 322.6 pounds of recoverable sugar per ton (RWST). The field was planted May 6, 2013, with the Beta 4N seed variety. The field yielded 27.56 tons per acre and 20.75% sugar.

Bruce and Gail are third generation farmers who live on the original farmstead. They have five children; Jake, Luke, and Adam, who farm with them near Ruth; another son, Andrew, farms with Bruce in the Capac area; and Laura, who is finishing her doctorate and teaches at University of Michigan in Ann Arbor. All of their children have college degrees. The family farm was predominantly dairy production for three generations until 1999 when Bruce sold the cows and changed the operation to a cash cropping system. Crops grown on the Maurer farm, besides sugarbeets, include corn, soybeans, dry edible beans, and wheat. The Maurers started growing sugarbeets in 1994 with a 40-acre contract. It didn't take long for them to increase their beet allotment; today Bruce and Gail grow over 250 acres of sugarbeets.

Jake grows an additional 250 acres of beets. The family shares land and equipment as they farm around the Ruth and Minden areas of Huron and Sanilac Counties. The Maurers have been growing their sugarbeets in narrow rows for five years (currently at 20-inch rows). In 2011, Jake purchased a Holmer self-propelled harvester, and, in 2012, Jake, Bruce, and two neighbors purchased a Holmer Terra Felis beet cleaner/loader for field cleaning and loading of field piled beets. The Maurers were the first growers in North America to use the Holmer product line.

Bruce and Gail's sugarbeets are custom harvested and field cleaned by Jake Maurer's group. Jake's group field cleans some 16,000 tons of beets for Early-Direct at Sebewaing and field cleans over 69,000 tons in the Ruth/Minden area during regular harvest.

Congratulations to Bruce and Gail for their high sugar achievement.

Bill Meylan (middle), West District President, presents Mark and Ron Mossner with the High Sugar Producers Award for the West District.

West District • Mark & Ron Mossner Partnership

Mark Mossner is the 2013 award winner for the highest sugar per ton (RWST) in the West District at 332 pounds. Even though Mark's name is on this winning contract, his brother, and partner, Ron Mossner is equally involved in all aspects of their farming operation.

These two modest young men claim there was nothing special about their growing practices for 2013 to cause them to win this award, other than planting early in April. They endured over eight inches of rain and were fortunate to receive two soft showers to ensure emergence.

Moldboard plowing cornstalks on their Tuscola County farm helped absorb the extra rainfall in April, and the fact that 68,000 seeds/acre of Beta 18RR4N were sown in 22-inch rows increased the odds of a healthy stand of 180 beets per 100 foot of row at harvest.

Nitrogen and potash were applied in the fall and spring, with liquid row starter at planting. The remaining nitrogen was applied after the April rains; therefore, it was mostly utilized and did not leech.

Quadris was placed in-furrow at planting and sprayed at eight-leaf stage for effective Rhizoctonia control.

Weeds were eradicated with three applications of Roundup® Powermax and leafspot was controlled with four applications of fungicides. Insects were not a problem.

This winning crop of RWST was harvested by the 23rd of October.

Ron and Mark had an astonishing crop of beets last fall. They do not have a specific answer as to why they won the sugar bounty award, as their practices are much the same as those in their neighborhood. It is very is satisfying when things work out and come together.

Central District Zwerk and Sons Farms

To achieve the highest sugar, you cannot simply plant your beets and hope they grow. Planning a beet crop starts in the winter with variety selection. Ideal conditions are also required when looking to plant your beet seed. You must also keep disease and weed pressure under control by tackling these problems, earlier rather than later.
Of course, Mother Nature is one factor that cannot be controlled, so having your beet crop healthy at the start is important if you want success.

Growing tons is not the only thing Zwerk and Sons Farms of Vassar can do well. With a grower sugar of 21.785%, it is clear that we are definitely on the "Road to 19" and may be making a turn on the "Road to 20." The Zwerks also had an RWST of 336.470, which means they deliver more sugar to our factories per ton of beets. This 54.3 acre field was planted on May 5 with the ACH variety RR059.

Zwerk and Sons Farms plant their 1,200 acres of sugarbeets in 22-inch rows with a 48-row planter. They control Rhizoctonia as well as Cercospora leafspot in a timely manner by spraying before the diseases arrive. They also have a good rotation and will plant radishes to help get the most out of their soil. The Zwerks harvest using a Ropa Tiger and participate in the early delivery program to harvest their beet acres in a timely fashion.

Congratulations to Zwerk and Sons Farms of Vassar for being high sugar producers.

Central District President Brian Rayl (far right), presents Marty Zwerk with the High Sugar Producer Award for the Central District.

YOUR DRIVE, *our knowhow.*
OUR DRIVE, *your knowhow.*
EITHER WAY, *it's a sweet match.*

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ACH V1 01/13

Sugarbeet Youth Project Awards

EAST DISTRICT

The East District held their annual Sugarbeet Youth Project Awards Banquet on January 13, 2014. Youth participation increased this year by 55% in the District's project. In 2012, 20 youths were involved, whereas in 2013, participation increased to 31 individuals. Seven Premier Award recipients and three Prestige Award recipients were honored at the banquet held at Woodland Hills Country Club of Sandusky.

Krista Roggenbuck, a senior at Harbor Beach High School, was Master of Ceremonies for the evening. Prestige winners were: Lauren Maurer, parents Duane and Diane; Krista Roggenbuck, parents Doug and Debbie; and Rebecca Balcer, parents Dan and Kay. All participants received a wall plaque with beet knife and a canvas/leather duffle bag.

Those receiving Premier Awards were: Jennifer Gentner and Heather Gentner, parents Craig and Mary Kay; Luke Gehring, parents Paul and Tracy; Matthew Leen, parents Mike and Julie; Adam Weber and James Weber, parents Randy and Angie; and Kara Maurer, parents Duane and Diane. The Premier award gifts were a Michigan Sugar padfolio and a logo pillow.

On June 7, all participants attended an evening baseball game at the Dow Diamond in Midland. The group of youths, with many parents in attendance, watched the Great Lakes Loons play baseball and were served a barbeque-style meal in the Pavilion. On July 10, all participants traveled (several by bus) to the Saginaw Valley Research and Extension Center in Richville. Students went on plot tours displaying sugarbeet diseases, pests, seed variety growth, and were shown how to prepare sugarbeets for fair exhibits. Participants were administered written tests and interviews by the Michigan Sugar Company agricultural staff.

CENTRAL DISTRICT

The Caro Area Youth Project of the Central District had 31 participants in 2013. There were two clubs and four leaders in the area. The Tuscola Beetniks were led by Viola Bierlein, Ashley Laux, and Genevieve Hecht. The Pioneers were led by Jason Hecht. The Awards Banquet was held on January 28 at the Sebewaing Sportsman's Club. Prestige winners this year for the Caro area were: Eric and Jennifer Mossner, son and daughter of Mark and Pam Mossner; and Macy Zwerk, daughter of Marty and Ann Zwerk. Premier winners were: Willie Keinath, Hans Bierlein, Kendra Mossner, Abigail Hecht, Lainey Zwerk, Jessica Hecht, Cameron Bauer, and Jackson Bauer.

The Sebewaing Area Youth Project of the Central District had 62 participants in 2013. The four Prestige winners were: Aaron and Emma Maust, parents Brent and Emily Maust; Adam Retford, parents John and Gina Retford; Jared Schuette, parents Dennis and Cathy Schuette.There were also ten Premier winners: Mitchell Richmond, Alexis Bushey, Luke Retford, Alexis Schuette, Jordan Maust, Andrew Smith, Alex Smith, Grant Gremel, John Lutz, and Shawn Gayari.

Participants were required to attend local club meetings, display a sugarbeet sample at the local county fair, complete a project book containing crop information, a field map, and a story. They were also encouraged to attend an informational field day held in July at the Saginaw Valley Research and Extension Center. At this field day, a written test and an interview was administered to the students. All these factors help determine the Prestige and Premier winners.

The year wasn't all work, however, as the group had a great time attending a Loons baseball game at the Dow Diamond in Midland.

WEST DISTRICT

The 2013 Annual Youth Project Awards Banquet was held on January 9 at the Trillium Banquet Center in Saginaw. This year, 29 students were involved in the youth projects, which resulted in six Premier Grower Awards and two Prestige Grower Awards.

Scoring for the award winners was based on a written test, interviews by company personnel, project books and a written story, District Agricultural Day attendance and county fair participation. All participants received great prizes this year with the Premier and Prestige receiving special awards. Participants receiving the Premier Grower Awards were Jeremy Hecht, Amber Brown, Kelly Ratajczak, Chris Ratajczak, Rylyn Hrabal, Kayla Ratajczak, and Payton Gerstacker. Those receiving the top honor of the Prestige Grower Awards were Amy Hecht, Landon Hrabal and Lindsay Hoard. The night was topped off by a great meal and a number of participants reading their written stories.

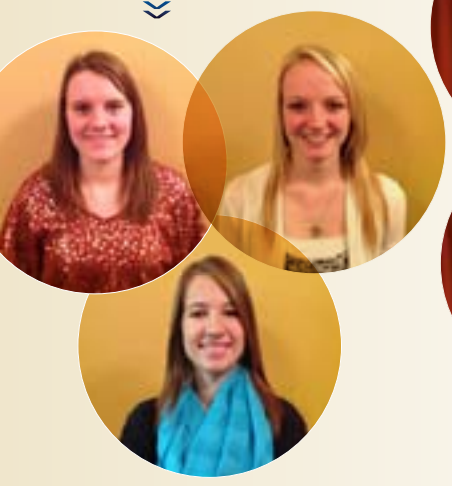
This past year, activities for our Youth Project participants included an educational morning at the Saginaw Valley Research and Extension Center on July 10. This was the third year the event was held there and worked out great for us to use that facility for the summer event. This was the second year all the youth project participants from around the state attended this event at the same time, in the same place.

The summer event was a huge success again this year with over 100 students attending. Students received information on weed identification, Sugarbeet Cyst Nematode issues in beets, Rhizomania, Rhizoctonia and Cecospora, and pesticide safety. Participants were also given their written test and were interviewed by the local field staff.

The Summer Fun Day was held on June 24 with the youth group attending a Loons Baseball game at Dow Diamond on a very beautiful evening. Along with our Youth Project participants, Michigan Sugar Company hosted a group of youths and sponsors from the Bay Area Boys & Girls Club again this year. This was a great event for the kids to participate in.

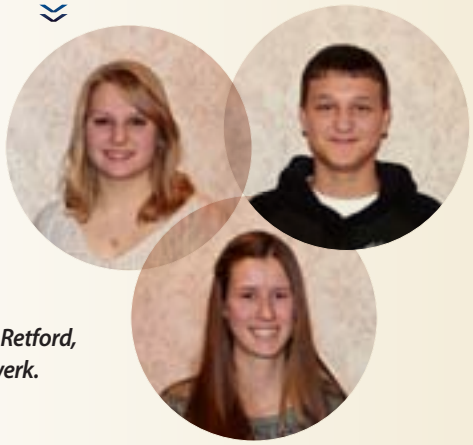
PRESTIGE AWARD WINNERS

Clockwise top left: *Lauren Maurer, Krista Roggenbuck and Rebecca Balcer.*



Clockwise, top left: *Aaron Maust, Emma Maust, Adam Retford, Jared Schuette, Jennifer and Eric Mossner and Macy Zwerk.*

Clockwise from top left: *Amy Hecht, Landon Hrabal and Lindsay Hoard.*



Thanks a Million!

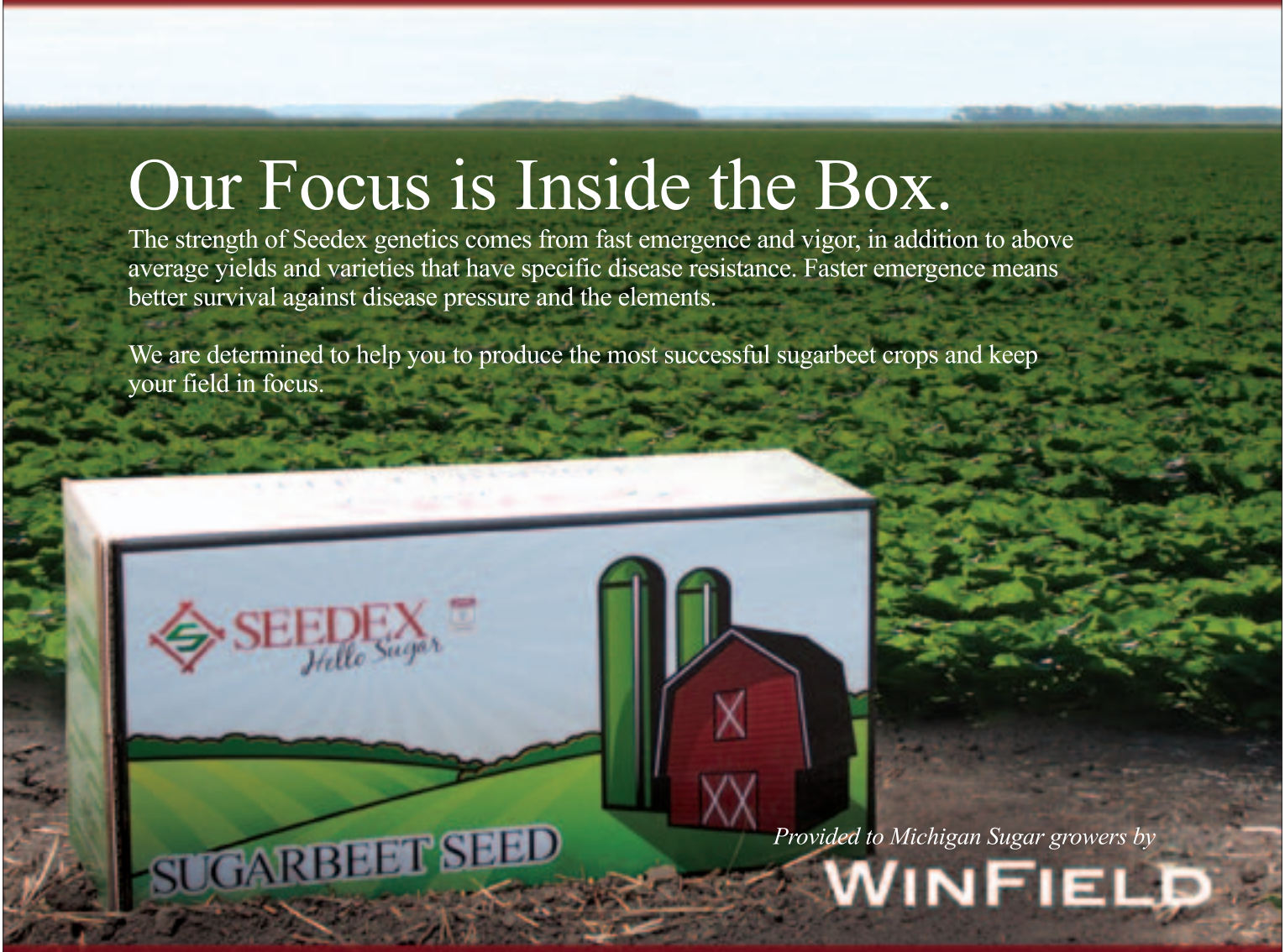
by Ray VanDriessche, Director of Community and Government Relations

"Thanks a million!" That was my Dad's favorite way of expressing his appreciation and his way of saying "thank you," in conjunction with a huge smile, when someone did something big or small for him or his family.

On behalf of Michigan Sugar Company, I would like to borrow Dad's expression of appreciation and say, "Thanks a million!" to a number of agencies, organizations, municipalities, and people who have made life a little better in some way, shape or form for our cooperative.

- To **Governor Snyder**, for taking the time and interest in touring our Bay City factory and visiting with company management and employees on October 21 in an effort to learn more about our industry and show his support.
- To **Michigan's congressional and state legislators** who support Michigan Sugar Company, and the sugar industry, on a national and state level. Special recognition is due to Senator Debbie Stabenow, Senator Carl Levin, Congresswoman Candice Miller, Congressman Dan Kildee, Congressman Dave Camp, Congressman Dan Benishek, Congressman Gary Peters, Congressman Sandy Levin, Congressman John Dingell, Congressman Mike Rogers and Congressman John Conyers for their support of our industry during the long and contentious Farm Bill process.
- To the **Monitor Township Board in Bay County** for helping to expedite and approve permits to install an additional aeration pond at our Bay City factory. The timeliness of being able to proceed and complete the project was critical with the next sugarbeet slice campaign quickly approaching. Thanks also for approving a $7.5 million tax abatement for capital investments at our Monitor Township site.
- To **Indianfields Township** for granting a tax abatement of $1,417,000 for the new super piler purchased for the Caro piling grounds, allowing us to improve grower delivery efficiencies.
- To the **City of Croswell** for granting a tax abatement of $1,608,000 for the pile storage ventilation system added at our Croswell storage site.
- To **Rob Clark and the Bay City Times Editorial Board** for an editorial they wrote on September 10 which was a very thoughtful opinion piece on odors in connection with the annual cleaning and maintenance of our wastewater ponds. The article emphasized the positive impact that Michigan Sugar Company provides to the local community through the many job opportunities and significant economic activity that is generated by our presence more than offsets the inconvenience associated with maintaining our wastewater treatment system.
- To the **Michigan Department of Transportation**, and especially Project Engineer, Louis Taylor, for taking into consideration the concerns of Michigan Sugar Company in connection with the M-46 resurfacing project adjacent to the Breckenridge beet receiving station. In an effort to address our concerns with harvest delivery, combined with road construction, the project was moved up one week and the staging of the initial construction phases were adjusted to minimize truck traffic congestion and backups for delivery into the beet receiving station. MDOT'S cooperation also was a great benefit to growers delivering grain to the MAC grain facility in the same vicinity.
- To the **city power and water departments** at all of our factory sites for their outstanding service to ensure that our facilities have the constant and adequate utility resources necessary to run and operate such utility intensive operations.
- To the **United Way of Bay County** for organizing a very well-run food pantry pickup at our annual food pantry sugar donation event that was held at the Bay City Milling warehouse on October 10. On a very cool morning, 7,200 lbs. of sugar that was donated by Michigan Sugar Company was loaded into the vehicles of 36 area food pantries in less than 40 minutes. Our company is blessed with the ability to give to those in need, but it would not be possible without the tireless efforts of the volunteers involved in the food pantries from Arenac, Bay, Clare, Saginaw, and Tuscola counties distributing much needed food items, such as sugar.
- Also to **United Way of Bay County and its volunteers** for planting, cultivating, harvesting and distributing the produce that is grown in the Community Garden located on Euclid Avenue at our Bay City location.
- To the **Sebewaing Village Chamber of Commerce** for promoting and highlighting our industry and the Sugar Queen's Court crowning event each year at the Sugar Festival.
- To the **many communities in Michigan and Ontario** in which our sugarbeet production, pile storage or processing is located. We appreciate their understanding and patience in connection with the inconveniences that are sometimes unavoidable during the harvesting and processing of sugarbeets.

SEEDEX



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Sebewaing	Cooperative Elevator	969 Pine St	Sebewaing	MI	89-883-3030	Joel Fischer
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North Branch	Cooperative Elevator	4290 N Branch Rd	North Branch	MI	810-338-4086	Dar Green
Ruth	Cooperative Elevator	4600 Ruth Rd	Ruth	MI	989-864-3391	Travis Tanton & Jim Terbrack
Bad Axe	Cooperative Elevator	210 Thompson Rd	Bad Axe	MI	989-269-9929	Dutch Seley & Tim Wilke
Ithaca	GAPS	3151 W Fillmore Rd	Ithaca	MI	989-875-7661	Phil Schneider & Ed Nickels
St Louis	A & E Ag	720 East Washington	St Louis	MI	989-681-3080	Chris Engle, Jason & Christie Apple
Fowlerville	Fowlerville Farm Services	320 Garden Lane St	Fowlerville	MI	517-223-9148	Kerrek Griffes
Rapson	Star of the West Milling	2222 N Verona Rd	Bad Axe	MI	989-269-7957	Amy Sweeney & Dennis Bischer
Richville	Star of the West Milling	3269 South Vanburen	Richville	MI	989-868-4186	David Jankowski & Jeff Martus
Kinde	Farmers Co-operative Grain Co	338 Main St	Kinde	MI	989-874-4200	Jeff Kreh
China	Schweihofer Seed Sales	3169 Allington St	China	MI	810-650-5819	Ryan Schweihofer
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Forest	Lakeside Grain & Feed	7858 Rawlings Rd	Petrolia	Ontario	519-490-5442	John Waters
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